Project: UPPER TAMOR HYDROPOWER PROJECT (285 MW) Taplejung, Nepal

Vehicle Recovery

&

Damage Assessment Report

Operational Incident Response and Fleet Restoration

Prepared for: Executive Leadership Team and Department Heads

Service Alliance

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1. Executive Summary

This report details a severe rollover incident involving a BULL HD96 Backhoe Loader near Palunga Chowk, Taplejung. The incident resulted in catastrophic structural damage to the vehicle's cabin and external components after tumbling down a steep embankment. Preliminary analysis, based on operator testimony, indicates a cascading mechanical failure involving both the braking system and a sudden steering lock, which led to a complete loss of control. The operator successfully evacuated the machine prior to the rollover.

2. Equipment & Incident Details

- **Asset Type:** Backhoe Loader (Backhoe Bull)
- **Make/Model:** BULL HD96
- **Asset Code:** 321 44 40
- **Engine No:** 4H.2744/2020037
- **Registration Number:** BA. PRA01.003KA.8612
- **Incident Type:** Off-road downward rollover
- **Incident Time:** 10:35 AM- 11:00 AM
- **Location:** 100m past Palunga Chowk
- **Operator Name:** Rajan Chaudhary
- **Operator Status:** Evacuated prior to impact (Jumped); medical cleared for minor injuries sustained during evacuation.

3. Description of the Incident

Based on the post-incident debriefing with the operator, the machine was traveling at an approximate speed of 20 km/h. The operator noted a loss of braking efficiency and attempted to apply the brakes twice with no response.

To mitigate a runaway scenario, the operator attempted a controlled crash by steering the machine toward the uphill embankment (*vittaa*). During this maneuver, the steering column locked unexpectedly. Having lost both braking and steering control, the operator made the decision to jump from the moving cabin. The machine continued forward with the steering locked, ultimately veering off the road edge and rolling over down the steep hillside.

4. Preliminary Damage Assessment

(Note: Final assessment pending recovery to the Priority Bay and cleaning)

Based on initial site photographs and visual inspection, the machine has sustained extensive trauma:

- **Cabin & ROPS/FOPS:** Complete structural collapse of the operator cabin. Total loss of glass, deformation of the roof structure, and destruction of internal controls.
- **Steering & Braking Systems:** Critical inspection required. The reported simultaneous failure suggests a potential catastrophic loss of hydraulic pressure or failure at the hydraulic pump/priority valve, as these systems often share hydraulic circuits.

- **Chassis & Powertrain:** High probability of frame distortion due to the tumbling impact. Engine and transmission mounts require immediate NDT (Non-Destructive Testing) inspection once recovered.
- **Hydraulics:** Loader arms and backhoe boom exhibit potential twist deformation. Hydraulic lines and cylinder seals are likely ruptured or compromised by impact shock.
- **Undercarriage/Axles:** Front and rear axles, along with steering linkages, sustained heavy impact loads and are presumed heavily damaged.

5. Recovery & Salvage Strategy

1. **Site Securing:** Secure the perimeter at Palunga Chowk to prevent fluid contamination or secondary accidents.
2. **Recovery Operation:** Dispatch an excavator or a heavy-duty crane with appropriate lifting slings to right the backhoe. Ensure lifting points do not cause further damage to salvageable hydraulic cylinders or structural pins.
3. **Tow to Workshop:** Transport the machine back to the Mitlung workshop. Do not attempt to start the engine.
4. **Root Cause Analysis (CBM Protocol):** * Inspect brake fluid reservoirs, master cylinders, and lines for ruptures.
    - Teardown the steering orbitrol valve and steering cylinders.
    - Check the main hydraulic pump and pressure relief valves for catastrophic failure.
5. **Salvage-First Triage:** Following extraction to the priority bay, the machine will undergo a strict triage process under the Salvage-First doctrine. Before considering write-off or total replacement, the powertrain (engine block, transmission) and major hydraulic pumps will be isolated, cleaned, and evaluated for viability. Structurally compromised components (cabin, bent cylinders) will be cataloged for replacement or targeted salvage to optimize the Fleet Health Index (FHI) and minimize overall downtime costs..

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